REMARKS

Applicants have amended Claim 14 to incorporate the subject matter of Claim 15 and clarify the present invention.

Initially, Applicants note that the Office Action, in paragraph 13 of the Office Action Summary, indicates that no certified copies of Applicants' priority document has been received. The priority document was filed in grandparent application, Serial No. 09/123,540, filed July 28, 1998, and thus carried on through the present division application. Notification of such filing is respectfully requested.

Applicants' invention, as now claimed, is to a semiconductor device having a semiconductor chip, a tape for mounting the semiconductor chip thereto, an adhesive resin layer interposed between the semiconductor chip and the tape, and solder balls arranged on the tape. The tape is of a material having a high water permeability of 10 $g/m^2 \cdot 24H$ or more, which is sufficient to prevent cracking and bulging of the semiconductor device which might occur when the solder balls are reflowed after the semiconductor device absorbs moisture. Such a semiconductor device is not taught or suggested in the cited prior art.

Reconsideration and removal of the rejection of Claim 14, as now amended, as anticipated by or obvious in view of Aoki et al. (U.S. 5,672,912) or as obvious in view of a combination of Aoki et al. and Suzuki et al. (U.S. 6,218,022) are respectfully requested in view of the present amendment and the following remarks.

Aoki et al. discloses, in Fig. 19, a resin-sealed type semiconductor device having a semiconductor chip 113, a tape 116 for mounting the semiconductor chip 113 thereon, solder balls 121 arranged on the tape 116, and holes 120 provided in and through the tape 116 to arrange the solder balls 121.

However, Aoki et al. does not disclose or suggest a tape having a high water permeability, as in the present claims.

A tape having a lower water permeability (for example, Upilex disclosed as a comparative sample 2) is conventionally used. The use of a tape having a low water permeability would be expected. For example, the tape 116 should have some stiffness so that it can be readily molded in the die and so that holes 120 can be reliably pierced therein. Also, the tape 116 should provide protection against the external environment (see column 11, lines 14-15, of Aoki et al.).

The object of the present invention is to provide a semiconductor device which can prevent cracking and bulging which might occur when the solder balls are reflowed. Aoki et al. does not disclose or suggest such an object.

The Aoki et al. reference does not disclose any particular polyimide resin, but merely teaches that the sealing resin may be a resin "such as epoxy resin or polyimide resin" (Col. 3, line 4) and that the insulating board (116) is made of polyimide resin (Col. 3, line 18) or "polyimide resin or the like" (Col. 4, line 7).

There are thus no particular resin or polyimide resin properties taught or suggested which would lead one to use the polyimide resin tape having high water permeability of $10g/m^2 \cdot 24H$ or more, as called for in the present claim. Aoki et al. thus does not anticipate or render obvious Applicants' claim, as amended.

A combination of Aoki et al. with Suzuki et al. also does not teach or suggest Applicants' claimed semiconductor device.

Aoki et al. is described above. Suzuki et al. is cited to show the use of Espanex as a polyimide tape. Suzuki et al. discloses many films made of polyimide. There are many kinds of polyimide films having various water permeability.

Suzuki et al. also discloses that a polyimide film can be used for a tape. However, Suzuki et al. does not disclose or suggest that a polyimide film having a high water permeability, as claimed, be used for a tape in a semiconductor device as claimed, at present, or that such use would provide the benefits as disclosed in the present application.

In view of the present amendment and the above remarks, Applicants' claim 14, as amended, is believed to be patentable and early action towards allowance thereof is respectfully requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees which may be due with respect to this paper, may be charged to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP

William G. Kratz, Jr.
Attorney for Applicants
Reg. No. 22,631

Atty. Docket No. 980931B
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
Tel: (202) 659-2930
WGK/nrp
Enclosure: Version with Markings to Show Changes Made
H:\HOME\NANCY\Amendments\980931B.frm

VERSION WITH MARKINGS TO SHOW CHANGES MADE IN THE CLAIMS:

Please amend Claim 14, as follows:

14. (Twice Amended) A semiconductor device comprising a semiconductor chip, a tape for mounting said semiconductor chip thereto, an adhesive resin layer interposed between said semiconductor chip and said tape, and solder balls arranged on said tape, characterized in that said tape is [made] of a material having high water permeability of 10 $g/m^2 \cdot 24H$ or more, sufficient to prevent cracking and bulging of said semiconductor device which might occur when the solder balls are reflowed after said semiconductor device absorbs moisture.